

Remarks/Arguments

A. Status of the Specification and Claims

The specification has been revised by replacing "E=f(T) plotting" with "E'=f(T) plotting" at page 27, line 9, of the English translated version of the specification. The addition of an extra "'" was due to a typographical error, which is readily apparent when reading the specification (*see e.g.*, page 27, line 21).

Claims 39 has been revised to incorporate the subject matter of dependent claims 51 and 53 (but for diurethanes being excluded from the list of antiplasticizing additives). Claims 54 and 56 have been revised to replace the term "group" with "compound." Claim 60 has been revised by removing the diurethanes from the list of antiplasticizing additives. Claims 51, 53, and 58-59 have been cancelled.

Claims 39, 41-50 and 52-82 are pending.

B. The Enablement Rejection Is Without Basis

Claims 39 and 41-82 are rejected under 35 U.S.C. § 112, first paragraph, for allegedly lacking enablement. Reference is made to *In re Wands*, 858 F.2d 731 (Fed. Cir. 1988) to support the enablement rejection. It should be noted that the Court in *In re Wands* found sufficient enabling support for the claims at issue and overturned the Office's enablement rejection. The same should be done in the present case.

While the Examiner concedes that the specification is "enabling for the disclosed combinations of thermoset plastic materials and antiplasticizing additives that do not react with said matrix," issue is taken with the apparent "breadth" of the phrase "a polythiourethane matrix or a polyepisulfide matrix" used in conjunction with the phrase "antiplasticizing additive." *See* Action at pages 3-4.

Applicant respectfully disagrees with the rejection. However, in an effort to further the prosecution and secure prompt allowance, the antiplasticizing agents in claim 39 have been further defined into subclasses identified throughout the specification and exemplified in the Examples. That is, the claims prior to any amendments were enabled, and the current claims are also enabled.

Additional arguments are presented in the following subsections to rebut the Examiner's enablement rejection. At the outset, however, Applicant takes issue with the following statement made by the Examiner at page 5 of the Action:

To make the instant situation more unpredictable, the term "antiplasticizing additive" and variants thereof are not often used in the art. Thus, it is difficult or impossible to figure out all of the combinations of thermoset plastic materials and antiplasticizing additives that do not react with said matrix encompassed by the instant claims let alone make them.

This statement is baseless and contrary to what is disclosed in Applicant's specification and to those having ordinary skill in the art relevant to the claimed invention. For instance, the specification plainly explains the concept of antiplasticization at page 3, line 27, to page 4, line 3, as:

Antiplasticization

Introducing a small, non reactive molecule into a polymer results in the plasticization of the material that is characterized by a drop in glass transition temperature (T_g), as well as by a decrease in the storage modulus as compared to the pure material. The additive is then called plasticizer. The antiplasticization as evidenced by Jackson and Caldwell (Jackson W. J., Caldwell J. R, J. Appl. Polym. Sci, 11, 211 (1967), Jackson W. J., Caldwell J. R, J. Appl. Polym. Sci, 11, 227 (1967)) does also express as a decrease in the glass transition temperature, but differentiates itself from plasticization in that the storage modulus increases in a temperature range that is generally close to the ambient temperature. In that case, the additive is called antiplasticizer.

Given this explanation, "it is incumbent upon the Patent Office, whenever [an enablement rejection] is made, to explain *why* it doubts the truth or accuracy of any statement in a supporting

disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement.” MPEP § 2164.04 (citing *In re Marzocchi*, 439 F.3d 220, 224 (CCPA 1971)) (emphasis in original). No such explanations, evidence or reasoning is presented.

Further, the specification cites to the following two references explaining the concept of antiplasticization: (1) Jackson and Caldwell, J. Appl. Polym. Sci, 11, 211 (1967); and (2) Jackson and Caldwell, J. Appl. Polym. Sci, 11, 227 (1967). These references were published in 1967, which confirms that the concept of antiplasticization was well-known to those of ordinary skill in the art at the time Applicant’s specification was filed.

Finally, a simple internet search utilizing the U.S. Patent Office database further confirms that the concept of antiplasticization and corresponding antiplasticization agents were known to those of ordinary skill in the art at the time Applicant’s specification was filed. *See, e.g.*, U.S. Patent 4,001,360 at col. 7; U.S. Patent 4,480,082 at col. 1; U.S. Patent 4,483,957 at col. 1; U.S. Patent 5,512,376 at col. 1. Applicant urges the Examiner to reconsider the position taken in the above block-quoted statement.

With that said, Applicant presents the following additional comments for the Examiner’s further consideration.

1. The Thermoset Plastic Materials Are Specifically and Precisely Claimed

The Examiner appears to be of the opinion that claim 39 does not specifically claim the particular thermoset plastic materials specifically and precisely. Action at page 3. This is not correct, in so far as the nature of the claimed matrix has been limited to polythiourethanes (PTU) or polyepisulfides in response to the second office action. Thus, claim 39 comprises precise structural features: the matrix is defined as having thiourethane groups or resulting from

polymerization of a composition comprising episulfides. Consequently, the statement of the examiner that all thermoset plastic materials are encompassed by claim 39 is erroneous (Action at page 3, line 3-16).

2. Enablement Analysis

(i) Relevant case law

The Federal Circuit has had the opportunity to decide a number of enablement issues. It is explained in *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1244, 68 USPQ2d 1280, 1287 (Fed. Cir. 2003) that “the applicant’s specification must enable one of ordinary skill in the art to practice the full scope of the claimed invention. That is not to say that the specification itself must necessarily describe how to make and use every possible variant of the claimed invention, for the artisan’s knowledge of the prior art and routine experimentation can often fill gaps, interpolate between embodiments, and perhaps even extrapolate beyond the disclosed embodiments, depending upon the predictability of the art.”

The enablement requirement is satisfied when one skilled in the art, after reading the specification, could practice the claimed invention without undue experimentation. *In re Wands*, 858 F.2d 731, at 736-737 (Fed. Cir. 1988).

A key issue that can arise when determining whether the specification is enabling is whether the starting materials or apparatus necessary to make the invention are available. In the present case, PTU and polyepisulfide matrices are well known in the art. The claimed antiplasticizing additives are available, either commercially (Specification at page 10) or through chemical synthesis involving standard reactions (Specification at pages 14-15).

(ii) *The selection of the additives and the quantity of experimentation needed to make or use the invention based on the content of the disclosure*

The disputed characteristic can be directly and positively verified by tests or procedures adequately specified in the description or known to the person skilled in the art, who is a specialist of polymers, without resorting to undue experimentation and without exercising inventive skill.

The selection of additives that do not react with PTU or polyepisulfide matrices does not require knowledge beyond the general knowledge available to those of skill in the art. Those skilled in the art do not require inventive skill to select appropriate additives that do not react with said polymer matrices.

Those skilled in the art can also determine without difficulty whether a particular additive has the claimed antiplasticizing effect toward a given matrix, and is therefore encompassed by the scope of the disputed claims (or on the contrary, a plasticizing effect), by performing common experimental tests.

The experimentation needed to identify whether a combination PTU or polyepisulfide / additive falls within the scope of claim 39 is reasonable, and all of the methods needed to such identification are simple and well known.

Indeed, the present application provides those skilled in the art with adequate information and directions concerning antiplasticization. *See e.g.*, pages 3-4 of the specification for a description of the antiplasticization phenomenon and page 27 explaining that the prepared samples were analyzed by several measuring devices so as to detect the antiplasticization. For example, DMA (dynamic mechanical analysis) viscoelasticity measurements make it possible to

detect antiplasticization. β transition attenuation (caused by antiplasticization, see specification at page 4) indeed immediately appears on $E'=f(T)$ plotting. This is illustrated at Figure 1.

Moreover, as explained in the specification, plasticization or antiplasticization properties of an additive can be simply verified by comparing the storage modulus E' (also called tensile strength or Young modulus) of the matrix with and without the additive. Antiplasticizing additives are those that increase the storage modulus of the matrix (specification at page 4, lines 1-3).

The storage modulus E' of a material can be conventionally evaluated using the procedure described in the standard ASTM D882. This experimental technique for determining the antiplasticization or plasticization nature of an additive is an objective procedure, which is typical in the art.

In any event, *In re Wands* explains that a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed. In the present situation, only routine experimentation is needed, and only a simple analysis per combination is required. Undue experimentation is thus not required. Therefore, it should be recognized that the present specification teaches one of ordinary skill how to identify suitable antiplasticizing additives.

(iii) *The amount of direction provided by the inventor and the level of predictability in the art*

Concerning the amount of direction provided by the inventor and the level of predictability in the art (Wands factors F and E), the attention of the Examiner is drawn to the following portion of the specification (page 4, L. 11-13 (underline added)):

A good affinity between the additive and the polymer is necessary for the antiplasticization. This is often achieved by using an additive the chemical structure of which is close to that of the matrix.

Adequate guidance is provided to those skilled in the art for the selection of the additives. It can be observed that a significant number of the disclosed and claimed antiplasticizing additives comprise urethane, thiourea, thiourethane or alkylene sulfide groups. Such groups are structurally identical or close to the groups present in PTU or polyepisulfide matrices. Therefore, the level of predictability in the art is reasonable.

The attention of the Examiner is also drawn to the following portion of the specification (page 5, L. 21-23):

[A]ntiplasticizing additives generally have a solubility parameter (δ_a) relatively close to that of the monomers previously used to form the matrix so as to be miscible in the latter.

Accordingly, those skilled in the art may choose the additive by knowing or calculating the solubility parameter of the monomers according to known methods. This also establishes a reasonable level of predictability in the art.

Adequate guidance is also provided by the disclosure of **twenty-eight (28)** specific examples of antiplasticizing additives that can be used in combination with PTU or polyepisulfide matrices. Moreover, **fifty-two (52)** matrix/additive combinations are exemplified. Additives that can be used are more broadly described at pages 6-9 and 13-14 of the specification.

(iv) *The existence of working examples*

The number of working examples (52) is sufficient for a full enablement over the whole of the field claimed. Since only an enabling disclosure is required, Applicant need not describe all actual embodiments, *i.e.*, the “infinite number” of combinations encompassed by the claims (*see* MPEP § 2164.02).

It is worth noting, in this regard, that several representative examples of antiplasticizing additives encompassed by the claims are given in the specification at pages 10-13 and Tables I and II. Twenty-eight (28) different individual additives with broad structural diversity and fifty-two (52) matrix/additive combinations are exemplified and fully described within the instant specification, which is more than sufficient to satisfy the enablement requirement.

(v) *The breadth of the claims*

The examiner has not stated why one would not expect to be able to extrapolate the examples across the entire scope of the claims. Adequate reasons have not been advanced by the examiner to establish that a person skilled in the art could not use the genus as a whole without undue experimentation. It has been shown that a significant number of PTU or polyepisulfide matrix/antiplasticizing additive combinations allow to obtain materials having improved impact resistance (*see above*).

The examiner does not raise any well-founded reason, any reason which would be supported specifically by a published document, demonstrating that there are well-founded reasons for believing that the skilled person would be unable, on the basis of the information given in the application as filed, to put the claimed invention into practice over the whole of the field claimed.

There is no well-founded reason for believing that other antiplasticizing additives than those specifically exemplified would not work, *i.e.*, would not improve the impact resistance of the matrix. Indeed, the examples given are representative of the claimed genus.

Moreover, the exact nature of the additive is only a secondary parameter. Any antiplasticizing additive belonging to the categories claimed in claim 39 can be used within a particular matrix so as to achieve the effects of Applicant's claimed invention, namely improving its impact resistance.

Although claim 39 does not indicate the exact nature of the members of each of the claimed categories of additives to be employed, the latter are functionally defined as being antiplasticizers and structurally defined as being dialkyl sulfides, diaryl sulfides, dialkylaryl sulfides, alkylaryl sulfides, arylalkyl aryl sulfides, aryl alkylsilane sulfides, compounds containing a carbonyl group having the formula indicated in claim 39, S-arylthioalkylates, bis-arylthioalkyls, compounds containing a thiourea group, or compounds containing one urethane group, which is expressly allowed for by the MPEP:

It is not necessary that every claim feature should be expressed in terms of a structural limitation. A claim may broadly define a feature in terms of its function, *i.e.* as a functional feature:

MPEP § 2173.05(g) Functional Limitations

A functional limitation is an attempt to define something by what it does, rather than by what it is (*e.g.*, as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a

particular capability or purpose that is served by the recited element, ingredient or step.

Although the limitation used to define the additives is both functional and structural, and not fully structural, it is perfectly acceptable because it set definite boundaries on the patent protection sought. *See In re Barr*, 444 F.2d 588, 170 USPQ 33 (CCPA 1971).

In the present case, Applicant is permitted to limit the nature of the additives that do not react with the matrix using the feature “antiplasticizing”, which is a functional feature of the claimed additive, since the invention cannot otherwise be defined more precisely without unduly restricting the scope of the claims. Further, and as noted at the outset of this enablement analysis, the term antiplasticizing is a well-known term of art used in the present field of endeavor. It is not, as the Examiner contends, a term that add to the “unpredictab[ility]” to the present invention or a term “not often used in the art.”

(vi) Conclusion concerning the enablement rejection

As a conclusion, the scope of enablement provided to one skilled in the art by the disclosure is commensurate with the scope of protection sought by the claims. The 1st § of 35 USC 112 does not require those skilled in the art to be able to imagine or figure out all of the combinations encompassed by the claims.

Further, the use of the claimed thermoset plastic materials for producing optical articles such as ophthalmic lenses is enabled and correlates with the entire scope of claim 39, which precludes a rejection for nonenablement based on how to use (MPEP § 2164.01(c)); *see also* MPEP § 2164.01(b) (“As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied.”).

C. The Anticipation Rejection Is Overcome

Claims 39, 47-51, 58, 62-63, and 73-75 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent 5,525,654 ("Podola"). In order to support the anticipation rejection of independent claims 39 and 58 in view of Podola, every element of the claims must be "identically shown" in this reference. *See In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

Applicant disagrees with this rejection (see arguments made in previous response, which are incorporated by reference). However, in an effort to further the prosecution and secure prompt allowance, claim 39 has been revised to exclude diurethanes as antiplasticizing agents. Therefore, the current anticipation rejection is moot.

D. The Obviousness Rejection Is Overcome

Claims 39, 47-51, 58, 62-63, and 73-75 are rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Podola.

Applicant disagrees with this rejection (see arguments made in previous response, which are incorporated by reference). However, in an effort to further the prosecution and secure prompt allowance, claim 39 has been revised to exclude diurethanes as antiplasticizing agents. Therefore, in order to maintain the current obviousness rejection the Examiner must show the existence of an "apparent reason" to modify the Podola composition by including within such composition an antiplasticizing agent listed in claim 39. That is, it is important for the Examiner to identify "an apparent reason to combine the known elements in the fashion claimed by the [application] at issue." *See KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41 (2007)

Applicant respectfully submits that such a showing cannot be done. For instance, it appears that the Examiner is relying on an inherency theory based on the existence of the

diurethane compounds in Podola to support the current obviousness rejection. Action at page 9. As previously noted, claim 39 is no longer directed to diurethane compounds. The end result of this is that the Examiner is left with having to show an apparent reason to incorporate an antiplasticizing agent listed in claim 39 into the Podola composition **without** relying on inherency. *See* MPEP § 2141.02(V) (“Obviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a certain feature is later established.”).

There is no apparent reason to incorporate an antiplasticizing additive listed in claim 39 into the Podola composition. For starters, Applicant’s specification explains the concept of antiplasticization at page 3, line 27, to page 4, line 3 (the exact statement is shown in the enablement analysis above).

By comparison, and as explained in detail in the previous response filed by Applicant, Podola aims at **plasticizing** a polythiourethane-siloxane matrix--*i.e.*, making it more elastic, softer, more processable and more flexible, as evidenced by the following passage:

This invention relates to scaling and/or adhesive compositions, based on alkoxysilate-terminated polyurethanes, which contain diurethanes as a plasticizer component . . . In these applications, elasticity, adhesive power and cure rate have to meet stringent requirements. Plasticizers may be added to this system to improve its elasticity and also its softness, flexibility and processability.

Podola at col. 1, lines 10-26 (col. 1, lines 23-25).

This is contrary to Applicant’s claimed invention, namely to carry out **antiplastification** of the matrix—hence, the claimed “antiplasticizing additive.” Consequently, incorporation of Applicant’s claimed antiplasticizing additive to the Podola composition would result in a less elastic, harder, and less flexible composition (Applicant’s specification at page 3, line 27, to page 4, line 3). That is, such a modification would render the Podola composition unsatisfactory for its intended purpose—*i.e.*, to plasticize its composition. This nullifies any apparent reason to

make such a modification to Podola. *See* MPEP § 2143.01[V] (“If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.”).

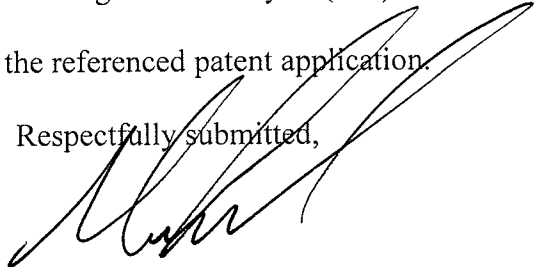
Further, Podola teaches away from Applicant’s claimed invention in at least the following respect. For a given matrix, diurethanes can be separated into two groups that do not overlap with one another: (1) those having antiplastifying properties; and (2) those having plastifying properties. It is apparent to a person of ordinary skill in the art that no diurethane compound can belong to both groups simultaneously—either one of ordinary skill desires plastifying properties or antiplastifying properties. Those of the first group increase the storage modulus of a polymer material (or attenuate a β secondary glass transition), while those of the second group decrease the storage modulus (*see* Applicant’s specification at page 3, line 27, to page 4, line 3). While keeping this in mind, Applicant cannot agree with the examiner that there would be an apparent reason to incorporate the first class of compounds into the Podola composition. If anything, a reading of Podola would lead a person of ordinary skill in the art to use the second group of diurethanes and steer clear of the first group. That is, Podola actually teaches away from the Applicant’s claimed invention. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.”).

The current claims are patentable over Podola for at least the above stated reasons and those stated in Applicant’s previous response. Therefore, Applicant respectfully requests that the current obviousness rejection be withdrawn.

E. Conclusion

Applicant believes that this case is in condition for allowance and such favorable action is requested. The Examiner is invited to contact the undersigned Attorney at (512) 536-3020 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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